

# **Far Ultraviolet intensities and center-to-limb variations of active regions and quiet sun using UARS SOLSTICE irradiance measurements and ground-based spectroheliograms**

## **ABSTRACT:**

The average intensity and center-to-limb variation of active regions, enhanced network (large-scale active region fragments), and quiet Sun are estimated by minimizing the variance between time series of the Solar-Stellar Irradiance Comparison Experiment (SOLSTICE) far-ultraviolet (FUV) irradiance measurements and a model of the solar irradiance that depends on the distribution of solar surface features. The model is constrained by grouping the broad range of solar features into four components that contribute the most to solar irradiance variability over the solar activity cycle. The areas of these components are identified on approximately 800 ground-based CA II K spectroheliograms with an algorithm that uses criteria of size, filling factor, intensity, and contiguity. These 800 maps are the "known" parameters to the solar irradiance model. The unknown parameters to this model are the average intensities and center-to-limb variation of these four components. Because of systematic uncertainties associated with the SOLSTICE measurements and the CA II K maps we are limited to reporting the computed intensities and center-to-limb variation of active regions, enhanced network, and quiet Sun for wavelengths between 120.0 and 170.0 nm. We find good spectral agreement between active region center-to-limb variations and image-based measurements and quiet-Sun center-to-limb variations. Intensities for plage, enhanced network, and quiet Sun are reported with a typical uncertainty of about 8%. This uncertainty is primarily associated with the SOLSTICE FUV calibration.